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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/624,615	07/21/2003	Jason H. Anderson	X-945 US	6584
24309	7590	05/17/2005	EXAMINER	
XILINX, INC			SIEK, VUTHE	
ATTN: LEGAL DEPARTMENT			ART UNIT	
2100 LOGIC DR			PAPER NUMBER	
SAN JOSE, CA 95124			2825	

DATE MAILED: 05/17/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

H-P

Office Action Summary	Application No. 10/624,615	Applicant(s) ANDERSON ET AL.	
	Examiner Vuthe Siek	Art Unit 2825	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 21 July 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-10 is/are rejected.
- 7) ☒ Claim(s) 11-16 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 21 July 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date <u>7/21/03</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This office action is in response to application 10/624,615 filed on 7/21/2003.

Claims 1-16 remain pending in the application.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1-3 and 9-10 are rejected under 35 U.S.C. 103(a) as being obvious over Rahut et al. (6,766,504).

4. As to claim 1, Rahut et al. teach a method for routing a partially routed design of an integrated circuit (IC), the design containing unrouted pins (see summary, Fig. 1-4 and its description). The method comprising routing the unrouted pins to generating a plurality of nets that contains a plurality of shorts or overlaps between nets (Fig. 1A, Fig. 2, initiate routing, col. 3, lines 50-67, routing produces congestion or overlapping); analyzing the first plurality of nets to obtain timing information (Fig. 2, initiate routing is operating in a delay mode for routing connections, col. 5); partitioning the first plurality of nets into a first and a second set of nets (all critical connections after timing information is updated are identified and collected, Fig. 3A, step 304, col. 8, lines 47-64, col. 4, lines 22-37); hiding the first set of nets (teaching of routing all identified and collected critical connections implies hiding the first set of nets or hiding non-critical

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connections), rerouting a subset of the second set of nets to substantially remove all overlaps in the second set of nets (Fig. 3A, routing until there are no critical connections, col. 8, line 47 to col. 9, lines 53, col. 2, lines 39-55). It is noticed that a purpose of rerouting is to reduce or eliminate congestion or overlapping or shorts.

Rahut et al. do not explicitly teach unhiding the first set of nets and rerouting a subset of the first set of nets and a subset of the rerouted second set of nets. Rahut et al. suggest routing all critical connections first or all connections, critical and non-critical connections may be routed a one time (col. 4, lines 22-37) and the purpose to routing as taught by Rahut et al. is for routing fewer interconnects in a delay mode in order to meet a desired circuit performance (col. 2, lines 30-55). Therefore, from above teachings and suggestions, it would have been obvious to one of ordinary skill in the art at the time the invention was made have included unhiding and rerouting as recited in the claims because if after timing analysis, the circuit performance of IC design has been met, and congestions or overlaps or shorts are still existed, both critical and non-critical must be rerouted in order to removed congestions or overlaps or shorts.

5. As to claims 2-3, Rahut et al. teach timing information is based calculated minimum path slack values of critical connections (nets having pins with an associated slack value less than a predetermined value) (col. 6-7).

6. As to claims 9-10, Rahut et al. teach providing method and apparatus for routing fewer interconnects in a delay mode in order to meet a desired circuit performance with reduced runtime expense for timing updates. The method of routing comprises routing and rerouting to eliminate congestions or overlaps or shorts of connections based on

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routing resources (delays), where connections include both non-critical and critical connections (first and second subset of nets) (summary, col. 7-8). Rahut et al. also teach routing including routing priority by sorting critical connections to be routed and rerouted (routing preferences) based on delays in order to meet circuit performance with reduced runtime expense for timing updates (col. 9, col. 2, lines 30-62).

7. Claims 4-8 are rejected under 35 U.S.C. 103(a) as being obvious over Rahut et al. (6,766,504) in view of Okano et al. (5,790,414).

8. As to claims 4-8, Rahut et al. teach providing method and apparatus for routing fewer interconnects in a delay mode in order to meet a desired circuit performance with reduced runtime expense for timing updates. The method of routing comprises routing and rerouting to eliminate congestions or overlaps or shorts of connections based on routing resources (delays), where connections include both non-critical and critical connections (first and second subset of nets) (summary, col. 7-8). Rahut et al. also teach routing including routing priority by sorting critical connections to be routed and rerouted (routing preferences) based on delays in order to meet circuit performance with reduced runtime expense for timing updates (col. 9, col. 2, lines 30-62). Rahut et al. all claimed limitations except routing parameters used to determine costs associated with routing resources. Okano et al. teach an optimum automatic routing unit that is feasible in short period of time even under severe conditions for a wiring design due to high-density of routing of the wiring design. The routing unit sets a cost parameter for at least one of routing, a number of curves, a length of parallel wires, and a number of wires adjacent to an unrouted wiring pin and automatically determines a route of a

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wiring pattern within a route controlled area of a wiring design based on the cost parameter set by the setting step, wherein the setting step sets the cost for routing parameters for each of the plurality of route controlled areas, and where the determining step determines the route of the wiring pattern in the overlapping portion based on the cost for routing parameters of one of the plurality of route controlled areas having a higher priority (see Fig. 1-15 and its description, specifically claims 1-10). Combining the above teachings would have been obvious to one of ordinary skill in the art at the time the invention was made to use different routing parameters to determine costs associated with routing resources because this would make it possible to determine the priorities of the routing controlled areas at a high rate so as to perform a optimum automatic routing to meet circuit performance in a time manner as expected.

Allowable Subject Matter

9. Claims 11-15 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims. The prior art of record does not teach or fairly suggest the routing includes all the steps of identifying and selecting as recited in the claims.

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Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Vuthe Siek whose telephone number is (571) 272-1906. The examiner can normally be reached on Increase Flextime.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Matthew Smith can be reached on (571) 272-1907. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Vuthe Siek


VUTHE SIEK
PRIMARY EXAMINER